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10/541,559	07/06/2005	Daniel Gagnon	PHUS030009US	5824

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ROSENBERGER, FREDERICK F	
ART UNIT	**PAPER NUMBER**
2884	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/541,559	Applicant(s) GAGNON, DANIEL
	Examiner Frederick F. Rosenberger	Art Unit 2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/6/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim to priority under 35 U.S.C. 119(e) for US provisional application 60/438222, filed on 6 January 2003, is acknowledged. The International Search Report for PCT/IB03/06242, dated 4 July 2004, has been received and considered.

Specification

2. The disclosure is objected to because of the following informalities: On page 8, line 30, "W_z" is referred to as the detector width, whereas elsewhere in the specification it has been referred to as the slat height (see page 8, line 17).

Appropriate correction is required.

Claim Objections

3. Claims 4, 12 and 13 are objected to because of the following informalities:

In claim 4, line 5, the recitation of "each generally linear detector" lacks proper antecedent basis in claims 1-4.

In claim 12, line 4, "the first generally toroidal housing" lacks proper antecedent basis in the claims 1, 11, and 12.

In claim 13, line 6, the recitation of "the first emission radiation" lacks proper antecedent basis in claim 13.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 18-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to a statutory category of invention (i.e. a process). However, the claims are directed to a judicial exception (i.e. a mathematical algorithm); as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claims must have either physical transformation and/or a useful, concrete and tangible result. The claims fail to include transformation from one physical state to another. Although, the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely reconstructing an image representation of the imaging volume from the projection views would not appear to be sufficient to constitute a tangible result, since the outcome of the reconstructing step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 29, applicant recites that the resolution and sensitivity referred to in claim 28 is equal to or greater than the resolution and sensitivity of a conformal, non-circular SPECT detector. As resolution and sensitivity are instrument specific, resolution and sensitivity can vary widely amongst the class of conformal SPECT systems. Absent absolute numbers the metes and bounds of the claim limitation cannot be ascertained.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 6, 8, 13, 14, 17, 18, 24, 26, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Gagnon et al. (European Patent Application Publication # EP-1008865-A2).

With regards to claim 1, Gagnon et al. disclose a nuclear camera (Figure 1) comprising a rotatable gantry **30** defining a gantry rotation axis **70** and an imaging isocenter (i.e. at the center of the gantry aperture) and a gamma detector **22** arranged on the rotating gantry, the gamma detector including a radiation sensitive surface **106** and a collimator **102** (Figures 2 and 3). Gagnon et al. further disclose that the detector

22 is rotated in a generally circular manner and that the detectors need not be moved radially with respect to the patient, thereby suggesting a fixed radial distance arrangement for the detectors on the rotating gantry (paragraphs 39 and 40). It is further noted that even detectors that can be moved radially are still capable of being set at a fixed radial distance.

With regards to claim 2, Gagnon et al. disclose a plurality of spaced-apart slats **102** arranged traverse to the radiation detection surfaces **106** and defining viewing planes between each slat pair (Figure 3).

With regards to claim 3, Gagnon et al. disclose a motor **136** for spinning the collimator and the radiation sensitive surface about a slat rotation axis **109** that is perpendicular to the gantry rotation axis (paragraph 42).

With regards to claim 6, Gagnon et al. disclose that the radiation sensitive surface consist of an array of individual solid-state detector elements **106a... 106n** (paragraph 45).

With regards to claim 8, Gagnon et al. disclose that the 4 or more detector heads may be used (paragraph 40).

With regards to claim 13, Gagnon et al. disclose a nuclear camera including 4 or more SPECT (paragraph 2) detector heads **22** (paragraph 40) arranged on a rotating gantry around an imaging region, the detectors including a radiation sensitive surface **106** the responds to the emitted radiation from a patient, a slat collimator **102** disposed on each radiation detector **22** between the detector and the imaging region to provide planar collimation, and a motor **136** for spinning the collimator and radiation sensitive

surface (Figure 3) of each detector **22** about a detector axis **109**. Gagnon et al. further disclose that the detector **22** is rotated in a generally circular manner and that the detectors need not be moved radially with respect to the patient, thereby suggesting a fixed radial distance arrangement for the detectors on the rotating gantry (paragraphs 39 and 40). It is further noted that even detectors that can be moved radially are still capable of being set at a fixed radial distance.

With regards to claim 14, Gagnon et al. disclose a rotatable gantry **30** on which the detectors **22** are disposed and an optically opaque housing of lead for each detector along with a portion of that housing which is transmissive for gamma radiation to allow for SPECT imaging (paragraph 39).

With regards to claim 17, Gagnon et al. disclose a radiological imaging method comprising the steps of circularly orbiting a radiation detector head **22** about a first axis of rotation **70** through an imaging volume and detecting the radiation from the imaging volume at a generally planar radiation sensitive region **106** of the radiation detector head **22**, the radiation sensitive region facing the imaging volume during the orbiting. Gagnon et al. further disclose that the detector **22** is rotated in a generally circular manner and that the detectors need not be moved radially with respect to the patient, thereby suggesting a fixed radial distance arrangement for the detectors on the rotating gantry (paragraphs 39 and 40). It is further noted that even detectors that can be moved radially are still capable of being set at a fixed radial distance.

With regards to claim 18, Gagnon et al. further disclose spinning a slat collimator **102** and the radiation sensitive array **106** about an axis **109** perpendicular to axis **70**

during the circular orbiting, integrating the radiation detected over planar regions defined by the slat collimators to generate projection views, and reconstructing the image representation of the imaging volume from the plane integral projection views (paragraph 42).

With regards to claim 24, Gagnon et al. disclose that the 4 or more detector heads may be used (paragraph 40).

With regards to claim 26, Gagnon et al. disclose an imaging apparatus comprising a rotatable gantry **30** defining a gantry rotation axis **70** and an imaging isocenter (i.e. at the center of the gantry aperture), three gamma detector heads **22** arranged on the gantry **30**, a collimator **102** located on each of the gamma detectors **22**, and a means **140** for processing data detected by the detectors to produce an image (paragraph 42). Gagnon et al. further disclose that the detector **22** is rotated in a generally circular manner and that the detectors need not be moved radially with respect to the patient, thereby suggesting a fixed radial distance arrangement for the detectors on the rotating gantry (paragraphs 39 and 40). It is further noted that even detectors that can be moved radially are still capable of being set at a fixed radial distance.

With regards to claim 27, Gagnon et al. further disclose each of the collimators includes a plurality of spaced apart slats **106a...106n** and a motor **136** for spinning the slats about a rotation axis **109**.

10. Claims 17 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Ashburn (US Patent # 6,147,352).

With regards to claim 17, Ashburn discloses a radiological imaging method comprising circularly orbiting (column 3, lines 64-65) a radiation detector **24** (Figure 1) about an imaging volume **1** at a fixed radial distance from a first axis of rotation **100** (Figure 4) through the imaging volume and detecting radiation from the imaging volume at a generally planar (Figure 6) radiation sensitive region of the radiation detector, the region facing the imaging volume during the orbiting.

With regards to claim 23, Ashburn disclose disposing a radiation-transmissive, optically opaque shield **84** between the detector **24** and the imaging volume which remains stationary during orbiting and blocking optical communication between the imaging volume and the radiation detector during orbiting (column 4, lines 2-7; column 6, lines 53-60).

11. Claim 17 is rejected under 35 U.S.C. 102(b) as being anticipated by Perusek et al. (US Patent # 4,651,007).

With regards to claim 17, Perusek et al. disclose a radiological imaging method comprising circularly orbiting (abstract; column 10, lines 1-5) a radiation detector **18** about an imaging volume at a fixed radial distance from a first axis of rotation through the imaging volume (i.e. the patient) and detecting radiation from the imaging volume at a generally planar radiation sensitive region (Figure 3) of the radiation detector **18** which faces the imaging volume during the orbiting.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 4, 5, 20, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al. (European Patent Application Publication # EP-1008865-A2).

With regards to claim 4, Gagnon et al. teach all the limitations of parent claim 3, as discussed above. Further, Gagnon et al. teach that the slats have a spacing **G**, a height $\mathbf{W_z}$, a width $\mathbf{W_y}$, and a thickness $\mathbf{W_x}$ that must be specified for the detector (paragraph 56). Gagnon et al. further teach that the ratio of the spacing to the height is selected to provide a desired spatial resolution and the width is selected to provide a desired detector sensitivity (paragraph 57). Thus, Gagnon et al. already teach optimization of the collimator dimensions based on desired resolution and sensitivity. Gagnon et al. do not discuss the affect of imaging time, radial distance, or slat pair. However, each of these variables is directly influenced by or influences detector sensitivity and detector resolution. Sensitivity directly impacts imaging time. Radial distance directly affects resultant resolution and sensitivity. Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made

to optimize the collimator parameters based on imaging time, radial distance, and slat pair as well as resolution and sensitivity, since these variables are related to the resolution and sensitivity of the detector.

With regards to claim 5, Gagnon et al. already teach optimization of the collimator height based on desired resolution. Gagnon et al. do not discuss that the height corresponds to a ratio of the fixed radial distance and the selected resolution. However, as noted above, the radial distance directly influences the detector resolution and sensitivity, i.e. greater radial distances result in decreased resolution. Thus, it would have been obvious optimize the collimator height based on the fixed radial distance and the desired resolution, since these variables are integrally related.

With regards to claim 20, Gagnon et al. teach all the limitations of parent claim 18, as discussed above. Gagnon et al. also teach that the detectors have a length C_x, width C_y, and height C_z that must be specified for the detector (paragraph 56). Gagnon et al. further teach that the energy resolution, sensitivity, cost, and leakage are all influenced by the detector dimensions (paragraph 57).. Gagnon et al. also teach that the sensitivity of the detectors is related to the $C_y + 2C_z$ (paragraph 49). Thus, it would have been obvious to select a minimum width C_y of the detector elements to provide a selected sensitivity, since Gagnon et al. teach that the width and height of the detector elements are directly related to the detector sensitivity.

With regards to claim 28, Gagnon et al. disclose an imaging apparatus comprising, four or more detector heads **22** arranged on a rotating gantry **30** around an imaging region (paragraph 40), a slat collimator **102** wherein the slat spacing **G** and the

slat height $\mathbf{W_z}$ are selected to provide a desired spatial resolution (paragraph 58), and the detector has a width $\mathbf{C_y}$. Gagnon et al. further disclose that the detector **22** is rotated in a generally circular manner and that the detectors need not be moved radially with respect to the patient, thereby suggesting a fixed radial distance arrangement for the detectors on the rotating gantry (paragraphs 39 and 40). It is further noted that even detectors that can be moved radially are still capable of being set at a fixed radial distance. Gagnon et al. further teach that the energy resolution, sensitivity, cost, and leakage are all influenced by the detector dimensions (paragraph 57). Gagnon et al. also teach that the sensitivity of the detectors is related to the $C_y + 2C_z$ (paragraph 49). Thus, it would have been obvious to select a minimum width C_y of the detector elements to provide a selected sensitivity, since Gagnon et al. teach that the width and height of the detector elements are directly related to the detector sensitivity.

With regards to claim 29, Gagnon et al. are silent with regards to the resolution and sensitivity compared with conformal SPECT systems. However, the resolution and sensitivity such requirements amount to a result-effective (i.e. improved resolution and sensitivity) optimization of variables (detector and slat collimator dimensions detailed in paragraph 56). Gagnon et al. disclose the claimed structure of independent claim 28. As Gagnon et al. already point out that the dimensions influence resolution and sensitivity, one of ordinary skill in the art would have been motivated to optimize said dimensions to achieve superior resolution and sensitivity.

With regards to claim 30, Gagnon et al. disclose that the each slat collimator **102** includes a plurality of spaced-apart slats **106a...106n** and a motor **136** for spinning the collimator about a slat rotation axis **109**.

14. Claims 11, 12, 15, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al., as applied to claims 1, 13, and 17 above, and further in view of Marks (US Patent # 5,391,877).

With regards to claim 11 and 23, Gagnon et al. teach all the limitations of parent claim 1, as discussed above. However, Gagnon et al. do not suggest a stationary toroidal housing enclosing the gantry and detector. Marks et al. teach a donut-shaped or toroidal housing **14** that encloses the entire SPECT system, including rotating gantry and detectors. Such a system would protect the detector heads from damage during motion by an object interposed in the detector path, as would be evident to one of ordinary skill in the art. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a toroidal housing to enclosure the gantry and the detector, as taught by Marks, so as to prevent inadvertent damage to the detector during motion, as would have been evident to one of ordinary skill in the art.

With regards to claims 12 and 15, Gagnon et al. is silent with regards to a second imaging modality being including at a fixed distance and being enclosed by a second toroidal housing. Gagnon et al. do allow for transmission imaging for attenuation correction as a second modality (paragraph 71), but fail to discuss the specifics of such a system. Marks further teaches a second toroidal housing **12** for CT system, thus

comprising a second modality compared to the first system **14**. The second housing is at a fixed distance from the first housing, as evident from Figure 1. The incorporation of the second imaging modality allows for the acquisition of CT and SPECT imaging simultaneously and the convolution of the resultant image data, resulting in a medical imaging and diagnostic tool more powerful than either instrument individually (column 3, lines 12-31). Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to provide a second imaging modality of CT adjacent the SPECT system so as to be able to perform simultaneous CT and SPECT imaging for improved imaging and diagnostics, as taught by Marks.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al., as applied to claim 8 above, and further in view of Engdahl et al. (US Patent # 6,303,935).

Gagnon et al. disclose all the limitations of parent claim 8, as discussed above. However, Gagnon et al. are silent with regards to including a pair of detectors on the gantry to perform coincident detection of positron annihilations (i.e. PET imaging). Engdahl et al. teach a combined PET/SPECT nuclear imaging system (Figure 1) wherein a pair of SPECT detectors **14a**, **14b** are combined on a single gantry **10** with a pair of PET detectors **12a**, **12b** to perform simultaneous PET/SPECT imaging. Engdahl et al. further teach that such a system on a single gantry allows for a versatile system that can perform simultaneous PET and SPECT imaging without compromising image quality (column 4, lines 42-48). Thus, it would have been obvious for a person having

ordinary skill in the art at the time the invention was made to employ a pair of PET detectors for coincident detection of positron annihilations on the same gantry as the SPECT detectors disclosed by Gagnon et al., so as to enable simultaneous PET and SPECT imaging without compromising image quality, as taught by Engdahl et al.

16. Claims 10 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al., as applied to claims 8 and 24 above, and further in view of Gagnon '675 (US Patent # 6,177,675).

Gagnon et al. disclose all the limitations of parent claims 8 and 24, as discussed above. However, Gagnon et al. are silent with regards to the gamma detectors being collimated for at least two different imaging resolutions. Gagnon et al. does not discuss the probability of using detectors with different resolutions although Gagnon et al. do discuss the dependence of resolution on the collimator geometry. Gagnon '675 teaches a gamma camera system (Figure 1) similar to that proposed by Gagnon et al. In such a system, each detector head **15** has a collimator **30** that defines a different resolution (abstract). As pointed out by Gagnon '675, such a system provides better image quality and added versatility and flexibility in selecting and viewing images of a patient from a single imaging scan (column 8, lines 39-42). Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to provide detector heads with different resolution so as to provide a system with better quality, versatility, and flexibility, as taught by Gagnon '675.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al., as applied to claim 13 above, and further in view of Balan et al. (International Publication Number WO-00/75691-A1).

Gagnon et al. disclose all the limitations of parent claim 13, as discussed above. However, Gagnon et al. are silent with regards to a CT scanner including a transmission radiation source and a transmission radiation detector on the rotatable gantry. Instead, Gagnon et al. only discuss a single imaging modality of SPECT detectors on the gantry. Balan et al. teach a combined gamma camera and CT system with SPECT detectors **12**, **14** mounted on the same gantry **22** as the transmission source **18** and transmission detector **20** (Figure 1a). In this manner, SPECT data obtained can be complemented by the X-ray attenuation data derived from the CT scan (page 18, lines 15-19). Further, since the imaging data acquired for both modalities occurs on the same gantry, alignment between the imaging data is simplified (page 2, lines 7-11; page 20, lines 14-31). Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to provide a CT scanner integral with the SPECT detectors on the same gantry, so as to allow for complementing the SPECT data with the X-ray attenuation data (i.e. attenuation correction) while facilitating alignment between the acquired data, as taught by Balan et al.

18. Claims 7, 19, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gagnon et al., as applied to claims 6, 17, and 18 above, and further in view of Ichihara (US Patent # 5,055,687).

With regards to claim 7, Gagnon et al. teach all the limitations of parent claim 6, as discussed above. Gagnon et al. further disclose that transmission radionuclide imaging may be used for attenuation correction (paragraph 71). However, Gagnon et al. are silent with regards to the specific structure employed in transmission imaging for attenuation correction, namely a radiation source on the rotating gantry and a transmission radiation detector mounted opposite thereto. Ichihara discloses a SPECT system (Figure 6) with attenuation correction wherein a radiation source **12-1** is disposed on the gantry and a transmission radiation detector **10-2** arranged opposite thereto to detect the transmitted radiation. The acquired attenuation data can then be used to compensate the SPECT image for absorption in the patient (column 1, lines 31-39; column 2, lines 4-10; column 4, lines 16-26). Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to include radiation source and transmission radiation detector on the rotating gantry to enable attenuation correction of the SPECT data with high accuracy, as taught by Ichihara.

With regards to claim 19, Gagnon et al. disclose all the limitations of parent claim 18, as discussed above. Ichihara further teaches that in SPECT imaging the detector heads may be rotated around the gantry by an angle of 360°/N, where N is the number of detector heads (column 1, lines 22-25). In the example illustrated in Figure 1 of Gagnon et al., three detector heads **22** would then be rotated about 360°/3 or 120°. Thus, the detector heads would occupy a common location only once in the orbiting (i.e. detector **22a** would occupy the spot of detector **22c** after a 120° rotation). Thus, the collimator should be spun 180° or 360° at each location. Although Gagnon et al.

doesn't specifically disclose the angle of spinning of the collimator and detector, Figure 9C of Gagnon et al. would suggest the spinning over 360°.

With regards to claim 21, Gagnon et al. disclose all the limitations of parent claim 17, as discussed above. However, Gagnon et al. are silent with regards to the angle orbited by the radiation detectors. Ichihara suggests that in SPECT imaging, the detector heads are rotated by an angle of 360° divided by the number of detectors (column 1, lines 22-25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose an angle of rotation of 180° divided by the number of detectors, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272,205 USPQ 215 (CCPA 1980).

With regards to claim 22, Gagnon et al. further teach that the collimator spacing **G** and the collimator height $\mathbf{W_z}$ are selected based on desired resolution. Gagnon et al. do not discuss selecting the collimator dimensions based on radial distance. However, the radial distance of the detector directly influences detector resolution. Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to optimize the collimator parameters based on radial distance as well as resolution, since radial distance directly affects resolution.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gregerson et al. (US Patent Application Publication #

2004/0022350) teach a radiation transparent optically opaque gantry housing a plurality of radiation detectors applicable to X-ray, SPECT, and PET systems (paragraph 49).

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is 571-272-6107. The examiner can normally be reached on Monday - Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Frederick F. Rosenberger
Patent Examiner
GAU 2884